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Neighborhood Conditions, Youth Exposure to Violence, and Substance Use

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Abstract

Vast research has been conducted on exposure to violence and its consequences. Among the many consequences of exposure to violence is substance use. Using the Pathways to Desistance data, this study seeks to examine whether exposure to violence impacts substance use among adolescents, whether neighborhood social disorder impacts substance use, and whether exposure to violence mediates the relationship between neighborhood social disorder and substance use. The test of mediation on these variables has never been conducted before. Findings of these analyses revealed that exposure to violence as a victim and witness were both found to increase the frequency of alcohol and marijuana use among adolescents. Further, neighborhood social disorder was found to decrease frequency of cocaine use. Lastly, exposure to violence partially mediated the relationship between neighborhood social disorder and substance use. Based on the findings, future studies should further examine these relationships. Several policy implications can be made including collective efficacy, violence prevention programs, testing and screening for exposure to violence, and substance use programs.

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Chapter 1: Introduction

Traumatic events, such as violence or victimization, occurring during adolescence are linked to a number of future problems. Some of these problems include mental health risks such as post-traumatic stress disorder (Jaycox, et al., 2002), anxiety disorders (Cooley-Quille, Boyd, Frantz, & Walsh, 2001), depression (Kennedy, Bybee, Sullivan, & Greeson, 2010), and behavioral concerns such as impairment in school functioning (Perkins & Graham-Bermann, 2012), aggression (Benhorin & McMahon, 2008), decreased rates of high school graduation (Grogger, 1997), criminal offending (Spano, Rivera, & Bolland, 2006), and substance use (Lopez, Kopak, & Pasko, 2019). The World Health Organization defines violence as an intentional use of force that results in injury (WHO, 2011). In 2004, roughly 1.4 million violent crimes were reported according to the Uniform Crime Report (Colbert & Krause, 2009). Youth in American cities witness a large amount of victimization ranging from hearing violent sounds to witnessing physical altercations that may lead to death or injury (Buka, Stichick, Birththistle, & Earls, 2001).

Generally, adolescents are more likely than adults to be exposed to violence both as victims and witnesses (Farrell, Mehari, Kramer-Kuhn, & Goncy, 2014). Estimates find 20-50% of children in the United States have been victims of violence (Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003) and, adolescents between the ages of 12 and 19 have a higher rate of victimization than any other age group (Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003). Additionally, the National Crime Victimization Survey identifies adolescents as being twice as likely to be victims of violence when compared to adults (Farrell, Mehari, Kramer-Kuhn, & Goncy, 2014). Further, the impact of community context is most heavily felt among poor, urban, minority and youth groups (Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003). As a result,

exposure to violence is generally higher among inner cities rather than in rural areas (Buka, Stichick, Birththistle, & Earls, 2001).

Due to the alarming rates of community violence and the negative impacts on children and adolescents, public health officials have established violence as one of the largest health issues facing the United States (Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003). Specifically, exposure to violence has been linked to increased crime and delinquency. Various studies have found that exposure to violence is a strong predictor of violent behavior (Dodge et al., 1990; Nofziger & Kurtz, 2005; Patchin et al., 2006; Spano, Rivera, & Bolland, 2006) and, several studies indicate that witnessing violence is a risk factor for substance use (Fagan, Wright, & Pinchevesky, 2014; Sullivan, Kung, & Farrell, 2004; Zimmerman & Kushner, 2017). Adolescents are a unique and fragile demographic; therefore, they are at risk for lasting trauma.

Neighborhood conditions are one of the many risk factors that can increase an adolescents' likelihood of engaging in substance use (Fagan et al., 2013). However, there is limited research examining the relationship between adolescent substance use and their environment (Mason & Mennis, 2010; Zimmerman & Farrell, 2017). The existing research has yielded inconsistent findings. Some studies have found that neighborhood conditions do not impact adolescent substance use (Brenner et al., 2011; Fagan et. al, 2013; Snedker, 2009; Zimmerman & Farrell, 2017), while others confirm the existence of this relationship (Choi et al., 2006; Tucker et al., 2013). Living in socially disorganized neighborhoods may lead adolescents to use illegal substances as a coping mechanism. It is necessary to further examine the relationship in order to better understand substance use behaviors among adolescents (Snedker, 2009).

The life-course perspective has been applied to substance use in order to identify long-term patterns of stability and change throughout the life span (Hser, Longshore, & Anglin, 2007). This framework expands substance use careers through the identification of key concepts such as transitions, trajectories, and turning points. Neighborhood context plays an important role in the life-course of an individual as it is related to work and school trajectories (de Vuijst et al., 2016). Life course theory posits that any point in an individual's life could be related and/or impact future events. Therefore, experiencing neighborhood social disorder can create experiences that hinder future events. Through the use of the life-course perspective, patterns of drug use can be examined to identify factors and events that can contribute to the persistence or desistance of substance use.

Using a life-course theoretical framework, the relationship between exposure to violence, neighborhood conditions, and substance use is examined in the current study. The data used are from Mulvey and colleagues' (2004) Pathways to Desistance study. Mulvey and colleagues conducted a longitudinal study of serious adolescent offenders during their transition from adolescence to adulthood. The Pathways to Desistance study was conducted in Maricopa County, Arizona and Philadelphia County, Pennsylvania, and sought to identify patterns of desistance, describe social and developmental changes promoting positive changes (such as academic commitment, spirituality, and motivation to succeed), and compare sanctions/interventions that promote these changes.

The current study will expand on the existing literature in a number of ways. First, unlike other studies that focus on substance use later in life, the current study will focus on substance use during the transition from adolescence to young adulthood. As most research on exposure to violence and substance use focuses on outcomes in adulthood (Kobulsky, Minnes, Min, &

Singer, 2016; Madruga, et al., 2011), the current study focuses on serious adolescent offenders. Mulvey et al. (2004) note that it is important to focus on *serious* adolescent offenders, as many longitudinal studies lack a large population of serious adolescent offenders. Second, serious adolescent offenders may be the group that is the least likely to desist when compared to other youth populations; therefore, it is important to study serious adolescent offenders in order to examine their substance use across time. Third, instead of solely focusing on marijuana, cigarette, and alcohol use (Poquiz & Fite, 2016; Roehler, Heinze, Stoddard, Bauermeister, & Zimmerman, 2018), this study examines hard drug use (i.e., cocaine use). Lastly, although the relationship between exposure to violence and substance use has been examined to some extent, little attention has been paid to identify whether neighborhood context impacts this relationship (Browning & Erickson, 2009; Fagan et al., 2015). Neighborhood social disorder is important to examine because it may lead to exposure to violence and substance use.

Chapter 2: Literature Review

Life-Course Theoretical Framework

Life course research focuses on human development and the role that individual experiences play over the life span. The life-course framework began in the 1960s as a response to questions and concerns regarding historical variations in family life (Elder & Shanahan, 2007). Since then, the life course framework has expanded to include human development from birth to maturity and appreciation for longitudinal studies. Life course research includes three key concepts – trajectories, transitions, and turning points (Elder & Shanahan, 2007). Trajectories are defined as pathways in the life span (e.g., work, school, parenthood), while transitions include changes in status (e.g., starting or leaving school/first job) (Elder & Shanahan, 2007; Hser, Longshore, & Anglin, 2007). Elder and Shanahan (2007) note that a significant change in trajectory, possibly during a transition, may symbolize a turning point or a change in the life course. An important theme in life course research is the identification of risk factors because they can lead to different trajectories. Life transitions, such as unemployment, can cause stress and adapting to those transitions can lead to different trajectories. Consistently found in life course research is the substantial impact and consequences of major life events, behaviors, and experiences for later social development.

To further understand the consequences of experiences and its importance in the life course development, the impact of exposure to violence on substance use will be examined. Life course theories have been used in several studies and applied to desistance from substance use (Crank & Teasdale, 2019; Hser, Longshore, & Anglin, 2007). The life course perspective allows for the exploration of patterns or trajectories and the ways those patterns are shaped. This exploration can be applied to patterns or trajectories of substance use.

Relationship between Age and Crime

One of the most widely accepted and oldest known finding in developmental criminology is the relationship between age and crime. This age-crime curve is the observation that criminal behavior reaches its highest point during the adolescent years of life and decreases during adulthood. Farrington (2003) notes the most important points of the age-crime curve – the peak onset age in offending is between ages 8 and 14 (the duration and commission of offenses can be predicted in the age of onset), while the prevalence in offending peaks between the ages of 15 and 19, and the peak age of desistance is between the ages of 20 and 29. Similarly, substance use increases during the transition between adolescence and young adulthood and then decreases in adulthood (Bachman et al., 1997). Hser et al. (2007) identify substance use initiation between the ages of 15 and 18, peaking in the late teenage years and early adulthood, and declining after age 25. Both substance use and criminal behavior share similar risk factors such as individual, family, peer, socioeconomic, school, and neighborhood factors.

One of the first to recognize the relationship between age and crime was Adolphe Quetelet. While researching crime in France between the years of 1826 and 1829, he discovered that crime rose with age, peaking around the age of 25 and decreasing thereafter (Rocque, Posick, & Hoyle, 2015; Quetelet, 1931). Noting that age was among the most prevalent causes of crime, Quetelet identified 25 as being the age in which criminal participation reaches its maximum (Quetelet, 1931). Similarly in 1904, Stanley Hall focused on tracking changes occurring during teenage years and found that crime, in all forms, increases between the years of 12 and 14 and peaks in late adolescence/early adulthood years. Hall (1904) argued that the increase in crime in adolescence is a result of the inability of having a fixed position in life, as well as the lack of social characteristics that come with adulthood. Around this time, the criminal

justice system recognized that age matters when it comes to crime, especially in relation to the number and types of offenses committed and the manner in which the offenders should be handled.

Labeled "the great debate", many criminologists were on opposing sides of the causes of crime and its relation to age across time relation to the meaning of age (Posick & Rocque, 2018). On one hand, Hirschi and Gottfredson (1983) argued that the shape of the age-crime curve was similar across time and place; therefore, there must be a characteristic of offending that leads to this increase and then decrease of crime over the life course (i.e., self-control). On the other hand, researchers like David Farrington (1986) found that social, biological, and physical factors are important, particularly when explaining the onset, frequency, duration, and desistance from crime.

Overall, longitudinal research has been shown to benefit the examination of age and crime (Farrington, 1986; Lauritsen, 1998; Rocque, Posick, & Hoyle, 2015). One of the major advancements of this relationship is the group-based trajectory approach. Introduced by Daniel Nagin and Kenneth Land (1993), the approach seeks to identify the similar or different pathways of offenders who are followed over time. This approach has repeatedly found several groups of offenders based on their sequence of offending over time. Therefore, it is implied that the age-crime curve is not the same for individual offenders.

Prominent Life-Course Theories

The concept of life course means more than the duration of an individual's existence. Instead of referring to the time between birth and death, life course refers to age-graded stages and social roles (Benson, 2013). Further, the patterns and variations people experience are part of the life course theory. The patterns are shaped by different factors including genetics,

demographic characteristics, family, friends, neighborhoods, and historical period. According to Benson (2013), researchers use three different domains of human behavior to create trajectories. These domains are biological, psychological, and social and can have interactive effects on one another.

Additionally, four core principles have emerged over the evolution of the life course perspective and now serve as a guide for research and theorizing. These four principles are historical time and place, timing in lives, linked lives, and human agency (Elder, 1994). Historical time and place refers to the idea that the time and location in which individuals live has a profound and great effect on development. Timing assumes that age determines how social events affect life patterns. Further, lives and experiences are interconnected through relationships (linked lives), and human agency signifies an individual's control over their own lives.

An important part of the life course transition is the process of desistance. Various theories attempt to identify the factors that lead individuals to desist from engagement in crime. Matza (1964) noted that the concept of drifting in and out of delinquency contradicted the sociological and psychological theories of criminal behavior. Further, he found that most criminological theories fail to account for an individual's ability to mature. Through the unmasking of sociological and psychological theories of crime, Matza (1964) identified a complex form of understanding delinquency – one where the difference between delinquents and non-delinquents was not that clear. Criminality, then, should be viewed as something individuals drift in and out of instead of something permanent.

Using a developmental taxonomy, Moffit (1993) argued that the age-crime relationship created two groups – life-course persistent offenders and adolescence-limited offenders. Life-course persistent offenders are considered to be a small portion of individuals who engage in

consistent and aggressive behavior throughout their whole lives. Characteristics of life-course persistent offenders include neuropsychological deficits, such as verbal and executive deficits (e.g., learning disabilities, inattention, impulsivity). These deficits, as described by Moffit (1993), can either be inherited from parents or acquired through home environments. Unfortunately, children with these deficits tend to be born into families who do not possess the resources to help them. As a result, some characteristics between children and their parents become synchronized, thereby, unintentionally exposing their children to criminogenic environments. As these neuropsychological deficits persist across time, this results in life-course persistent antisocial behavior. Additionally, children with such deficits tend to experience more problems in childhood when compared to adolescence-limited offenders (Moffitt, 1993). Life-course persistent offenders are considered to be a small portion of individuals who engage in serious and persistent antisocial behavior throughout their entire life.

In contrast, the other group of offenders identified by Moffitt as adolescence-limited offenders tend to be a larger group of offenders who generally only engage in criminal activity during adolescence. Their deviant behavior is temporary, usually beginning at puberty and ending in young adulthood. In contrast to their life-course persistent offender counterparts, adolescence-limited offenders do not exhibit the same neurological deficits. Adolescence-limited offenders begin offending as a result of mimicking the antisocial behavior of life-course persistent peers – their engagement in crime needs peer support unlike life-course persistent offenders who are willing to offend alone. Adolescents who engage in criminal behavior may do so based on their lack of maturity, peers, or strains, therefore, they desist from engagement once they become adults and gain freedom. Further, as adolescence-limited offenders exit the maturity gap and gain legitimate and tangible adult roles, they lose motivation for delinquency (Moffitt,

1993). From the perspective of adolescence-limited offenders, once they reach adulthood and attain privileges they desired as teens, consequences of delinquency shift from rewarding to punishing. Reaching adulthood causes them to notice they have something to lose by continuing their engagement in antisocial behavior. Their option to desist from engagement in delinquency is an easy option, as they do not have the neuropsychological deficits or accumulated antisocial personality found in life-course persistent offenders. Based on Moffitt's (1993) dual taxonomy, an adolescence-limited offender readjusts and ceases to offend, however, the life-course persistent offender continues, accounting for the tail of the age-crime curve distribution.

Sampson and Laub's (1993) age-graded informal social control theory focuses on the strength of social bonds (e.g., family, peers, and school) and adult social institutions (e.g., marriage and jobs). Sometimes considered the middle ground between non-developmental theory and multi-group developmental framework (Piquero, 2015), this theory attempts to explain how the loosening of social bonds can increase antisocial behavior during adolescence causing antisocial behavior to be more likely to occur when these bonds are weakened or broken.

According to Sampson and Laub (1993), antisocial behavior in childhood is low due to attachment to parents and teachers, however, in adolescence, these bonds weaken and are eventually replaced with bonds involving antisocial peers. Adolescent attachment to delinquent friends increases the prevalence of substance use and peaks in the teenage years. Subsequently, as adulthood is reached, bonds are replenished. With a concentration in the positive life events that can cause desistence from antisocial behavior among youth, Sampson and Laub (1993) found that social bonds, such as marriage and employment, serve as turning points and decrease the likelihood of antisocial behavior throughout adulthood. For example, men who become attached to jobs or their spouse may increase their self-control and change their routine activities.

Additionally, this theory identifies work, family, and school roles as important in the facilitation of socialization which causes individuals to abstain from substance use (Sampson & Laub, 2001; Sampson & Laub, 1993).

Additionally, neighborhood context has been linked to the life course perspective. The developmental consequences of one's residential environment across the life course has gained attention in the social science discipline over the years (Browning et al., 2016). Inquiry into neighborhood effects on well-being has gained popularity among researchers (Browning et al., 2016). Collectively, neighborhoods have been found to influence a variety of outcomes (Sampson et al., 2008). Specifically, neighborhood socioeconomic status has been tied to mental/physical health, crime, and education among other outcomes (Harding, 2003; Ross, 2000; Sampson, 2012).

The life course perspective can be linked to neighborhood and place approaches. The concept of agency is a major component of the life course perspective. It plays an important role in life course trajectories. The concept of agency, previously mentioned, signifies making decisions (e.g., engaging in crime). However, Browning et al. (2016) noted that when studying agency, researchers do not take into account the role of one's neighborhood. Neighborhoods, by design, imply such determinism that trumps an individual's agency. Applying the linked lives concept to neighborhood and place, life course perspective extends to include shared routine activities. Some of these routines are shared with friends, family, and/or coworkers. Empirical research has found consistent support for the relationship of neighborhood influences on life course outcomes. Specifically, research has found that disadvantaged neighborhoods influence adolescent development, exposure to violence, and substance use (Buka, Stichick, Birththistle, & Earls, 2001; Elias Alvarado, 2016; Reboussin et al., 2019).

The Life Course & Substance Use.

The study of substance use focuses on long-term patterns in order to identify change throughout the life span. Substance use careers parallel criminal careers as many criminologists consider substance use as a subcategory of illegal behavior (Hser, Longshore, & Anglin, 2007). Onset, regular use, cessation, and relapse are key concepts in substance use careers.

The onset of substance use consistently has been found to occur during adolescence. Most substance use careers begin during the period of transition between childhood and adulthood as individuals attempt to adjust to new norms and expectations (Vaughn & Perron, 2010). A concentration of deviant behavior, such as substance use, in adolescence can play a pivotal role in the life course development (Krohn, Lizotte, & Perez, 1997). Engagement in substance use can be a long-term trajectory or a short-term transition. Specifically, short-term transitions may cause long-term developmental consequences due to the constant movement in and out of various trajectories and their impact on an individual's success (Krohn, Lizotte, & Perez, 1997). Risk factors for engagement in substance use include family history of substance use, exposure to violence, low self-control, ADHD symptoms, and early aggressive behavior. Further, the age of onset is a strong predictor for future use and dependence. Defined by Kandel et al. (1978), initiation is "the first experience with a particular drug" (p.14). Findings from their study showed a variation of factors that lead to the initiation of substance use – involvement in minor criminal behavior was found to be correlated to hard liquor use; beliefs favorable to the use of marijuana were consistent with the use of marijuana; and feelings of depression, parental factors, and contact with peers who used drugs were linked to illicit drug use (Kandel et al., 1978). Factors similar to those that impact initiation also impact persistence. Psychological factors (e.g., psychopathology), biogenetic factors (e.g., family histories of alcoholism), and

socialization factors (e.g., peer influences) can increase and cause persistence of substance use (Chassin et al., 2004; Fenton et al., 2012; Stice et al., 1998).

Relapse to substance use is relatively understudied in the substance use literature, as it is a phenomena that is difficult to assess. Relapse can be identified as a single event or a process. The process of relapse is identified as being part of treatment or recovery. Further, Hser et al. (2001) note that risk and protective factors for substance use initiation can be found in relapse (e.g., psychiatric conditions and lack of familial support). There are various types of relapses, such as returning to a specific substance used previously and/or using a new substance to replace a previously used substance (Hser, Longshore, & Anglin, 2007). For this and other reasons, relapse is a complicated pattern to study as it involves the use of multiple kinds of drugs and patterns.

Desistance can be characterized by behavioral change from one state to another – from offending to non-offending. Desistance from drug use, or cessation, is the least studied portion of substance use research (Hser, Longshore, & Anglin, 2007). Despite the importance of understanding and identifying the methods and reasons as to why individuals desist from substance use, cessation is difficult to study as there is no consensus on the amount of time that is sufficient to follow-up on whether an individual has stopped engaging in substance use. While involvement in substance use can be a phase most individuals grow out of, not all individuals desist from substance use.

Existing Research on Exposure to Violence, Social Disorder, & Substance Use

Approximately one in five youth are exposed to violence yearly, while about three in five are exposed to violence by the time they reach young adulthood (Zimmerman & Kushner, 2017). The concept of exposure to violence is multifaceted including direct victimization (e.g., being

assaulted, attacked, abused) and/or indirect victimization (e.g., witnessing physical assault, shootings, and murder) (Fleckman et al., 2016; Peterson et al., 2019). Exposure to violence leads to a variety of consequences for youth, including psychological problems, internalization problems (e.g., anxiety, distress, withdrawn behavior, and fear), externalization problems (e.g., deviant and aggressive behavior), crime, delinquency, and substance use. Thus, being exposed to violence may result in challenging transitions into adulthood. The prevalence of being exposed to violence is high during adolescence making it an important period in the life-course. However, not all individuals who are exposed to violence experience negative outcomes. Some youth who are exposed to violence can still meet their developmental goals (e.g., interpersonal relationship success and adaptation to their environment) despite their exposure (Fagan, Wright, & Pinchevesky, 2014; Lynch & Cicchetti, 1998).

The relationship between exposure to violence and violent behavior has been well-documented (Dodge et al. 1990; Nofziger & Kurtz 2005; Patchin et al. 2006; Spano, Rivera, & Bolland, 2006). Used as a framework, the "cycle of violence" has linked and explained the relationship between exposure to violence and violent behavior (Widom, 1993). The "cycle of violence" can be thought of as the process in which victimized adolescents, specifically those abused and neglected, become future perpetrators of crimes of violence (Widom, 1993).

Although a large body of research finds a positive relationship between exposure to violence and violent behavior, it is difficult to identify whether exposure to violence has a long lasting effect on violent behavior. Spano et al. (2006) note that there is a lack of research on the short and long term effects of exposure to violent behavior. Further, in their study, Spano et al. (2006) found that despite the positive relationship between the impact of exposure to violence and violent behavior, the impact was shown to only have a short term effect on violent behavior.

In one of the first studies examining the long-term effects of adolescent exposure to violence, Dutton and Hart (1992) found results supporting the cycle of violence hypothesis. Their findings suggest that adolescent victimization was associated with aggressive and violent behavior in adulthood. Further, they were able to identify that specific forms of adolescent victimization were associated with specific forms of adult violence. For example, adults who were physically abused as adolescents were more likely to be physically violent. Conversely, adults who were sexually victimized were more likely to be sexually violent. Despite the lack of research on the kind of effect of exposure to violence on violent behavior, the studies previously discussed seem to suggest that exposure to violence in adolescence can result in long-term consequences for violent behavior. On the other hand, non-violent offending has been found to be correlated with exposure to violence (Farrell & Zimmerman, 2018). Exposure to violence can lead to negative emotions such as anger, which can lead to the need for corrective action, such as engaging in property crime. In a study conducted by Farrell and Zimmerman (2018), exposure to violence was hypothesized to have an effect on property crime. Consistent with their hypothesis, results suggest that all types of exposure to violence were positively associated with property crime.

Exposure to Violence and Substance Use

A vast amount of research has been conducted on the negative consequences of exposure to violence (Fagan et al., 2014; Pinchevsky et al., 2013; Sullivan et al., 2004; Wright et al., 2013; Zinzow et al., 2009). Substance use has been identified as one of the many consequences of being exposed (Kilpatrick et al., 2000; Mrug & Windle, 2009; Sullivan et al., 2004; Vermeiren et al., 2003; Wright et al., 2013; Zinzow et al., 2009), and exposure to violence and its relationship to substance use has gained increased scientific attention (Atherton et al., 2017).

For instance, Kilpatrick et al. (2000) interviewed 4,023 adolescents between the ages of 12 and 17 about substance use (individual and familial), victimization (sexual/physical assault and witnessing violence), and posttraumatic reactions, in order to identify risk factors for substance abuse/dependence. They measured alcohol use as ingesting five or more drinks on a given day in the past year. Marijuana and hard drug use (i.e., cocaine, heroin, inhalants, LSD, or prescription drugs) were measured by asking respondents if they ever ingested marijuana or hard drugs nonmedically. Victimization was measured by identifying if respondents had experienced sexual/physical assault or witnessed violence. Lastly, *DSM-IV* substance abuse/dependence measure was used to determine their abuse/dependence diagnoses. Control variables included familial substance use and demographic characteristics. Kilpatrick et al. (2000) found that adolescents who were sexually/physically assaulted or who witnessed violence were at higher risk for substance use, including alcohol, marijuana, and hard drugs. In the same study, researchers found that adolescents who witnessed or experienced victimization reported drug use at an earlier age than those who had not been victimized (Kilpatrick et al., 2000). Limitations to this study included its cross-sectional nature, which limits the possibility of a long-term impact analysis. Also, the study was limited to those who resided in homes with telephones. Researchers noted that telephone interviews may not be the best way to assess substance use among adolescents.

Similarly, Zinzow et al. (2009) examined whether witnessing community and parental violence were risk factors for substance use and delinquency among adolescents. In this study, witnessing violence combined both parental violence and community violence. Parental violence was measured using questions which asked about witnessing parents fighting or becoming violent with one another, along with questions regarding the prevalence of the fighting.

Conversely, community violence was measured by asking respondents about witnessing a number of criminal events, such as shootings, stabbings, sexual assaults, threats of violence, and serious physical assaults. Substance use was measured using the *DSM-IV* criteria for substance use (e.g., alcohol, tranquilizers, sedatives, amphetamines, opioids, steroids, marijuana, cocaine, hallucinogens, inhalants, and club drugs). Criteria for substance use problems was determined based on the use of the drug, non-medically, on four or more occasions. Lastly, delinquency was measured by asking respondents about their participation in delinquent acts. Demographic variables (age, gender, race/ethnicity, and poverty) and direct trauma history (i.e., sexual/physical violence, natural disaster, serious accident) were controlled. Using a national sample of 3,614 adolescents and running two logistic regression analyses, Zinzow and colleagues found that exposure to violence (i.e., witnessed community violence) was associated with substance use problems. Specifically, chronic violence exposure, knowing the perpetrator, and violence occurring outside of the school setting were the only types of community violence associated with substance use. Limitations to this study included the cross-sectional nature of the study. Additionally, self-report measures were used which can result in recall bias and/or under-reporting of sensitive events, such as violence exposure and substance use. Lastly, the study focused on severe forms of violence witnessed. As a result, the findings cannot be generalized to adolescents who have witnessed less severe forms of violence. Substance use among adolescents may occur because they are not mentally nor emotionally prepared to deal with the consequences of being exposed to violence (Sullivan et al., 2004).

The majority of substance use initiation occurs during adolescence (Kilpatrick et al., 2000; Kuhn, 2015; Mrug & Windle, 2009; Wills & Shiffman, 1985). Various studies examine this relationship. For instance, Sullivan et al. (2004) sought to examine the relationship between

witnessing violence and drug use initiation. The substances measured included cigarettes, beer and wine, and liquor. Findings seem to suggest that witnessing violence was associated with initiation of cigarette, beer, wine, liquor, and advanced alcohol use among adolescents. Specifically, results showed that 19 and 27 percent of non-users at baseline started using cigarettes, beer, and wine at Wave 2. Conversely, liquor use between baseline and Wave 2 were lower. Prevalence of witnessing exposure to violence was found to be higher in adolescents living in rural areas, as the majority of the adolescents, approximately 61%, had witnessed at least one violent act in their lifetime. Similarly, Mrug and Windle (2009) used a crossed-lagged structural equation model to examine the relationship between alcohol use initiation and exposure to violence in early adolescence (approximately 11 years of age). Confirming the relationship between exposure to violence and substance use, Mrug and Windle (2009) found that witnessing violence predicted the initiation of alcohol use in early adolescence.

Additionally, Vermeiren and colleagues (2003) investigated the relationship between exposure to violence and reported substance use. Their sample included 3,380 adolescents between the ages of 14 and 17 in Belgium, Russia, and the United States (958 from Antwerp, Belgium, 1,036 from Arkhangelsk, Russia, and 1,386 from New Haven, Connecticut). Using logistic regression analyses, findings suggest that adolescents exposed to violence in the previous 2 years showed higher levels of substance use (i.e., smoking, alcohol use, marijuana use, and hard drug use). These findings are consistent with the hypothesis that the use of substances (i.e., cigarettes, alcohol, marijuana, and hard drugs) has been repeatedly found to help alleviate the memories and feelings of being exposed to violence. The constant exposure to violence can increase the likelihood of substance use (i.e., cigarettes, alcohol, marijuana, and hard drugs) due to the relief felt from its consumption.

Using the longitudinal data from Project on Human Development in Chicago Neighborhoods, a number of studies examined the relationship between exposure to violence and substance use initiation (Pinchevsky et al., 2013; Wright et al., 2013; Zimmerman & Kushner, 2017). For instance, Wright et al. (2013) sought to examine the impact of exposure to violence and victimization on subsequent alcohol and marijuana use among adolescents. Employing multivariate statistical models, they found support for prior research indicating that exposure to violence leads to substance use. Specifically, they found that community violence and child abuse were more likely to lead adolescents to marijuana use when compared to alcohol use. Further, accumulated exposure to violence resulted in long-term alcohol and marijuana use. Altogether, findings suggest that exposure to violence is likely to increase the frequency of alcohol and marijuana use. However, different forms of exposure to violence lead to different substance use.

Additionally, Zimmerman and Kushner (2017) used the Longitudinal Cohort Study component of the PHDCN to examine the contemporaneous, short-term, and long-term impacts of exposure to violence on substance use. Data collected from adolescents and their caregivers were used to run hierarchical logistic regression models. Results of the analyses revealed that exposure to violence has long-term effects on alcohol, marijuana, and illicit drug use. Additionally, due to the reciprocal nature of the relationship between exposure to violence and substance use, it is likely that individuals who engage in substance use are exposed to criminogenic contexts, which can facilitate their exposure to violence.

Lastly, Pinchevsky et al. (2013) assessed whether the relationship between exposure to violence and substance use varies by biological sex. Results confirmed the well-known finding that substance use increases after exposure. Both indirect and direct exposure to violence were

found to increase subsequent substance use in males and females. Further, other experiences, specifically peer influence, were found to be strong predictors for substance use when compared to exposure to violence. Additionally, findings suggested that indirect exposure to violence is more likely to predict substance use when compared to direct victimization. In addition to their findings, Pinchevsky and colleagues found a biological sex difference among adolescents – females who had been victimized engaged in more frequent binge drinking than males. Despite biological sex specific differences in exposure to violence (i.e., females are less exposed to community violence, females are more likely to experience trauma, males tend to react with more externalizing behaviors, and females tend to react with more internalizing behaviors), substance use is consistently found among those exposed (Löfving-Gupta et al., 2018).

The previously discussed studies focus on the effects of exposure to violence among adolescents. Initiation of substance use has been found to occur in adolescence and is often the result of exposure to violence (Kilpatrick et al., 2000; Mrug & Windle, 2009). Further, this relationship may occur because substance use alleviates the memories and feelings of being exposed (Vermiren et al., 2003). Other experiences and factors may play a role in the path to substance use. Some of these factors include delinquent peers, neighborhood characteristics, and family factors (Zimmerman & Kushner, 2017; Zinzow et al., 2009) . Despite the possibility of other influences, studies have consistently found that adolescents exposed to violence, as a victim or witness, are more likely to engage in some form of substance (Fagan et al., 2014; Fagan et al., 2015; Kilpatrick et al., 2000; Mrug & Windle, 2009).

Exposure to Violence, Substance Use, and Neighborhood Context

A large body of literature supports the strong relationship between exposure to violence and substance use (Fagan et al., 2014; Fagan et al., 2015; Kilpatrick et al., 2000; Mrug &

Windle, 2009; Pinchevsky et al., 2013; Vermeiren & colleagues, 2003; Sullivan et al., 2004; Wright et al., 2013; Zimmerman & Kushner, 2017; Zinzow et al., 2009). However, there is a lack of research focusing on the impact of neighborhood context on exposure to violence and substance use (Browning et al., 2009; Fagan et al., 2015). Additionally, Fagan et al. (2015) note that few studies have examined the direct effects of neighborhood context on substance use or how they impact victimization. Neighborhood context increases the risk of exposure to violence which may place adolescents at higher risk for substance use (Whipple, 2018). If adolescents engage in substance use to cope with negative feelings and those adolescents living in disadvantaged neighborhoods are more likely to be victimized, then living in a disadvantaged neighborhood may worsen the impact of exposure to violence on substance use.

Disadvantaged neighborhoods are often characterized by weak local institutions, lack of access to external resources, lack of collective efficacy, poverty, and social disorganization (characterized by physical and social disorder) (Harding, 2009; Karriker-Jaffe et al., 2017). Weak local institutions reduce the community's access to resources necessary for formal/informal control. Further, collective efficacy is a form of formal/informal control within the neighborhood. It can be difficult to regulate behavior when collective efficacy in low or non-existent due to weak social bonds among residents. Poverty also has been identified as a core characteristic for social disorganization in communities (Sullivan, Kung, & Farrell, 2004). Social disorganization theory was developed by the Chicago School in an effort to identify how neighborhood disorganization can lead to increased crime, violence, and disorder. Ultimately, the theory states that the social characterization of the community or residence may be more significant than individual characteristics (e.g., low education levels, few resources, and lack of ability to resolve problems). Further, a community's success relies upon its resources, energy to

solve problems, and collective efficacy. The theory posits that the absence of positive community characteristics can lead to problem behavior as a result of the lack of compliance with social rules and order. Negative community and individual characteristics can form an environment that can breed violence, to which youth can be exposed to.

Living in a disadvantaged environment can result in exposure to violence. Various studies confirm that adolescents living in poor neighborhoods or neighborhoods with low socioeconomic status are exposed to violence (Buka, Stichick, Birththistle, & Earls, 2001; Gladstein, Rusonis, & Heald, 1992; Selner-O'Hagan, Kindlon, Buka, Raudenbush, & Earls, 1998). Similar studies reveal that exposure to violence can place youth at risk for substance use (Fagan et al., 2014; Pinchevsky et al., 2013; Sullivan et al., 2004; Wright et al., 2013; Zinzow et al., 2009). In addition, socially disorganized neighborhoods can increase the chance of substance use among adolescents (Fagan et al., 2015; Reboussin et al., 2019). Reboussin et al. (2019) found that neighborhood physical disorder was strongly associated with marijuana use initiation. Specifically, they found that physical disorder in low-income urban neighborhoods increased the likelihood of the transition from no marijuana use to frequent marijuana use. Additional findings suggest that even in disadvantaged neighborhoods, collective efficacy was found to prevent initiation and continuance of marijuana use. Further, Fagan et al. (2015) examined the relationship between exposure to violence, neighborhood disadvantage, and substance use among adolescents. Their analyses revealed that victimization increased likelihood of marijuana use, consistent with previously discussed studies. Additionally, they found that neighborhood context impacted the relationship between exposure to violence and alcohol and marijuana use. Lastly, Pei et al. (2020) used national data to examine the relationship between neighborhood social cohesion and adolescent substance use. Their analyses revealed that adolescents who live in

neighborhoods with higher social cohesion have less substance issues than their counterparts. Pei et al. (2020) argued that neighborhood social cohesion plays a protective role in substance use because it increases the likelihood that the community will monitor and influence youth activities

However, other studies have found a negative association between neighborhood community disadvantage and substance use (Gordon et al., 2020; Hanson & Chen, 2007) For instance, Gordon et al. (2020) found that community disadvantage was associated with adolescent substance use. However, they also found that greater disadvantage *decreased* the likelihood of substance use. Such findings may be a result of the accessibility of substances – certain substances are price sensitive, therefore, usage would be greater among those in less disadvantaged neighborhoods. This discrepancy may be consistent with Hanson and Chen's (2007) finding that adolescents from low socioeconomic backgrounds were less likely to engage in substance use than adolescents from affluent backgrounds.. Overall, studies have yielded inconsistent findings when examining the relationship between neighborhood disorganization (e.g. physical disorder, lack of social cohesion, low socioeconomic status) and substance use among adolescents.

Various studies on exposure to violence and substance use have used the Project on Human Development in Chicago Neighborhoods (PHDCN) data set. The PHDCN data includes a longitudinal portion which focused on families that resided in one of 80 neighborhood clusters identified by the project's investigators and had at least one child in one of seven age cohorts (birth, 3, 6, 9,12, and 18 years of age). Data for the PHDCN were collected in three waves between the years of 1994 and 2002. Substance use was measured using a questionnaire to determine whether or not respondents had used alcohol (i.e., beer, wine, wine coolers, and/or liquor), marijuana, and other illicit drugs (i.e., cocaine, crack, inhalants, psychedelics, heroin,

methamphetamines, amphetamines, barbiturates, and tranquilizers) in the year preceding the wave interviews. Measures for exposure to violence included a questionnaire asking whether respondents have ever seen or been present when someone was shoved, kicked, punched, attacked with a knife, and/or shot.

Fagan et al. (2014) examined whether neighborhood collective efficacy reduced the relationship between exposure to violence, substance use, and violence among 1,661 and 1,718 adolescents from the PHDCN longitudinal data. Collective efficacy was measured using ten items from a Community Survey which asked about social cohesion, willingness to help, whether neighbors can be trusted, people in the neighborhood sharing same values, as well as other measures. Additionally, control variables for this study included individual level factors that have been identified by previous research as being associated with substance use and violence (i.e., demographic characteristic, youth self-control, involvement in unstructured/routine activities, parent supervision, and presence of social support from family members and peers). Using hierarchical modeling techniques, Fagan and colleagues tested the direct effects between neighborhood collective efficacy, exposure to violence, and substance use. They found that exposure to violence was linked to increased likelihood of tobacco, marijuana, and alcohol use. Also, their findings suggest that victimization was related to a larger variety of substance use.

In a similar study, Fagan et al. (2015) sought to understand the relationship between exposure to violence and substance use and how neighborhood context contributes to the relationship. Additionally, they examined whether collective efficacy moderated the relationship between exposure to violence, substance use, and violence. Using the longitudinal data from the PHDCN, Fagan and colleagues controlled for individual-level factors (i.e., age, gender, and

race/ethnicity), family factors (i.e., household salary and parent problems with drugs or alcohol), peer factors (i.e., routine activities, peer substance use, low self-control, and perceived harm of drug use), and prior alcohol/marijuana use. Specifically, this study sought to examine the relationship between exposure to violence and subsequent alcohol and marijuana use, as they are the more frequently used substances among adolescents (Johnston et al., 2011). With a sample size of 1,416, Fagan and colleagues ran a hierarchical Bernoulli regression model and were able to determine that being exposed to violence increased the likelihood of marijuana use, but not alcohol use. The lack of effects on alcohol use indicate that victims of exposure to violence are not any more likely to engage in alcohol use than their non-victim counterparts. Additionally, neighborhood characteristics were examined to determine whether it impacted adolescent substance use. Findings suggest that neighborhood conditions were not directly tied to substance use, however, they were found to impact the relationship between victimization and marijuana use. Further, findings of the moderation analysis suggest that collective efficacy moderated the relationship between exposure to violence and substance use. However, results also found that collective efficacy did not moderate the relationship between exposure to violence and youth violence. Limitations of these studies included lack of generalizability due to the data being for one city (Chicago). Additionally, researchers only included alcohol and marijuana as their substance use measure. They did not account for hard drug use.

The Current Study

Previous research on the relationship between exposure to violence and substance use has been well-documented. Many findings discussed above note that adolescents who have been exposed to violence engage in substance use (Fagan et al., 2014; Fagan et al., 2015; Kilpatrick et al., 2000; Mrug & Windle, 2009; Pinchevsky et al., 2013; Sullivan et al., 2004; Vermeiren et al.,

2003; Wright et al., 2013; Zimmerman & Kushner, 2017; Zinzow et al., 2009). Specifically, this relationship has been noted regardless of whether adolescents have been exposed to indirect or direct victimization (Pinchevsky et al., 2013). Further, substance use initiation for adolescents who have been exposed to violence tends to occur at an earlier age than their non-exposed counterparts (Kilpatrick et al., 2000). Additionally, the rates of exposure are found to be higher in rural areas making substance use higher in those areas as well (Sullivan et al., 2004). Despite consistent findings that exposure is linked to at least one form of substance use, studies have noted that the relationship between exposure and marijuana use is stronger than the relationship between exposure and alcohol use (Fagan et al., 2015; Wright et al., 2013). These findings may be a result of the lack of accessibility of purchasing alcohol as an adolescent. In addition, many limitations exist. Among the limitations are the use of cross-sectional studies, lack of focus on substances other than marijuana and alcohol (i.e., hard drugs, such as cocaine), and lack of generalizability (i.e., school-based samples and telephone interviews).

Recent literature has identified the need for future studies to include neighborhood context to further explore the relationship between exposure to violence and substance use (Browning et al., 2009; Fagan et al., 2015). Some factors within neighborhood context include neighborhood disadvantage, neighborhood disorder, and collective efficacy. Consistently, neighborhood disadvantage has been linked to exposure to violence and substance use (Fagan et al., 2015; Gordon et al., 2020; Pei et al., 2020; Reboussin et al., 2019). Collective efficacy has been linked to exposure to violence and substance use, however, findings are mixed and sparse (Browning, 2010; Fagan et al., 2014; Musick et al., 2008; Whipple, 2018). Despite the lack of research and mixed findings on collective efficacy and exposure to violence, more research

should be conducted in order to understand the relationship between neighborhood context (including neighborhood disorder), violence exposure, and substance use.

Fagan et al. (2015) examined whether neighborhood characteristics moderated the impact of victimization on substance use. However, no studies have examined whether exposure to violence mediated the relationship between neighborhood social disorder and substance use. Additionally, previous studies examining neighborhood conditions have measured economic disadvantage, community norms, social cohesion, and physical disorder (Fagan et al., 2015; Pei et al., 2020; Reboussin et al., 2019). Nevertheless, studies examining this complex relationship have not included specific measures for social disorder.

The current study extends previous research in a number of ways. First, this study seeks to identify whether exposure to violence mediates the relationship between neighborhood social disorder and substance use. Second, this study focuses on *serious* adolescent offenders, instead of adult offenders or less-serious adolescent offenders. Third, the measure for substance use will also include cocaine use, instead of solely examining cigarette, alcohol, and marijuana use. Fourth, this study will examine whether exposure to violence mediates the relationship between neighborhood social disorder and substance use.

The following hypotheses will be tested in this study:

Hypothesis 1: Exposure to violence (both as a witness and victim) increases the likelihood of substance use (i.e., alcohol, marijuana, cocaine use).

Hypothesis 2: Perceived neighborhood social disorder increases the likelihood of substance use (i.e., alcohol, marijuana, cocaine use).

Hypothesis 3: The effect of perceived neighborhood social disorder on substance use is mediated by exposure to violence. In other words, the presence of social disorder in a

neighborhood increases the likelihood of an individual being exposed to violence, which then increases the likelihood of substance use (i.e., alcohol, marijuana, and cocaine use).

Chapter 3: Methods

Using data from the Pathways to Desistance study, the current study will examine youth exposure to violence and substance use. This dataset was selected due to its large population of serious adolescent offenders. Inclusion criteria for the study require individuals to be in Maricopa County, Arizona or Philadelphia, Pennsylvania, at least 14 but less than 18 years old at the time of the commission of offense, and found guilty of a serious offense (mostly felonies but some serious misdemeanors). Enrollment for the study began in November 2000 and ended in January 2003. Throughout the study, 1,354 serious adolescent offenders were followed across a period of seven years. During the time the adolescents were followed, a series of assessments were conducted. Assessments on adolescents included evaluating their psychological development, mental health, and experience with the criminal justice system. The Pathways to Desistance data is a major data set that followed the lives of adolescents. Despite data collection occurring in the early 2000s, the data collected is comprehensive. Additionally, measures like neighborhood social disorder may have little to no differences in recent years when compared to the years in which the data was collected. Overall, findings would most likely remain the same regardless of the age of the data set.

The purpose of this study is to examine how exposure to violence and neighborhood conditions impact substance use. Establishing substance use as the dependent variable, the impact of social disorder and exposure to violence will be examined, while controlling for other important predictors of substance use, such as parental warmth, gang membership, gun accessibility, race, age, gender, peer influence, self-control, and expectations of success.

Additionally, this study will examine whether exposure to violence helps explain the relationship between neighborhood social disorder and substance use. Little to no studies have examined the mediation of this relatiobnship.

Measures

Dependent Variable: Substance Use

The dependent variable for this study is substance use in the past 6 months. Substance use is measured using the modified version of the Substance Use/Abuse Inventory (Chassin et al., 1991). This inventory measures adolescent illegal drug and alcohol use over the life course and in the past 6 months. For the purpose of this study, substance use is measured using a frequency. Engagement in substance use in the past 6 months is measured on a scale of 1 to 9, where 1 is not at all and 9 is every day. The substances measured include alcohol, marijuana, and cocaine. Cocaine is used as it is the most often reported hard drug in the data set. Each substance will be measured separately in order to identify the impact of exposure to violence on each.

Independent & Mediating Variables

Exposure to violence as a victim and witness will be examined as an independent variable, as well as a potential mediating variable, using the Exposure to Violence measure. This measure was adapted from Selner-O'Hagan, Kindlon, Buka, Raudenbush, and Earls (1998) to assess the frequency of exposure to violent events. Exposure to violence is measured by asking respondents if they have experienced or observed specific types of violence. For instance, 6 items are used to ask about victim experiences (e.g., “Have you ever been chased where you thought you might be seriously hurt?"). Further, 7 items are used to ask about observed experiences (e.g., "Have you ever seen someone else being raped, an attempt made to rape someone or any other type of sexual attack?"). Additionally, respondents will be asked about

their exposure to death through four questions (e.g., “Has anyone close to you tried to kill him/her self?”). Responses ranged from 0 to 6 events to which participants have been exposed to violence. Thus, higher scores indicate greater exposure to violence.

The neighborhood social disorder scale used for this study is measured using the Neighborhood Conditions measure. This measure assesses the environment around an adolescent's home (Sampson & Raudenbush, 1999). Social disorder was measured using the mean of 9 social disorder questions. Respondents were asked about social disorder in the neighborhood (e.g., "Adults fighting or arguing loudly," "people using needles or syringes to take drugs"). The scale included 21 items with responses ranging from "Never" = 1, "Rarely" = 2, "Sometimes" = 3, and "Often" = 4.

Control Variables

The control variables for this study include age, biological sex, race, parental warmth, peer delinquency, gang membership, gun accessibility, expectations of success, and self-control.

Respondents' age was assessed as a continuous variable and ranged between 14 and 19 years. Biological sex of respondents was used as a dichotomous variable where 0 = Female and 1 = Male. Lastly, respondents reported their race by selecting from the following options – White, Black, Hispanic, or other.

Parental warmth serves as a control variable in the current study. Supportive parenting can prevent problem behavior because they can provide both emotional and social support. This measure accounts for warmth from both mother and father and is measured using the Parental Warmth and Hostility Measure. This measure was adapted using the Quality of Parental Relationships Inventory developed by Conger, Ge, Elder, Lorenz, and Simons (1994) to assess the affective tone of the parental-adolescent relationship. Items from the measure ask about

mother and father warmth (e.g., "How often does your mother let you know she really cares about you?" and "How often does your father tell you he loves you?"). The scale includes 42 items, half assessing the maternal relationship and the other half assessing the paternal relationship. Participants indicated their responses using a 4-point Likert scale ranging from "Never" = 1, "Sometimes" = 2, "Often" = 3, and "Always" = 4. Ultimately, higher scores indicated more a supportive and nurturing parental-adolescent relationship.

Adolescents who are exposed to substance-using peers are likely to learn to engage in substance use (Zimmerman and Kushner, 2017). Therefore, peer delinquency will be controlled for. Peer delinquency is measured using the Peer Delinquent Behavior subset to assess the degree of antisocial activity among adolescent's peers. Two dimensions were used in this scale – Antisocial Behavior (e.g., "How many of your friends have sold drugs?") and Antisocial Influence (e.g., "How many of your friends have suggested that you should sell drugs?"). The scale contains 19 items where participants responded using a 5-point Likert scale ranging from "None of them" = 1, "Very few of them" = 2, "Some of them" = 3, "Most of them" = 4, and "All of them" = 5. The mean of the 19 items was computed and the scores ranged from 1 to 5. Therefore, higher scores indicate higher peer delinquency.

In addition to peer delinquency, gang participation was also included. Gang participation is an indicator of neighborhood social disorder, as well as peer delinquency. Respondents were asked the following question: "Were you ever a member of a gang/posse?" This variable is measured as dichotomous where no participation in a gang is coded as 0 and participation in a gang is coded as 1.

Additionally, expectations of success was also controlled for. Expectations to reach goals, such as having a career, is one of the processes in that helps adolescents steer away from

substance use and delinquency (Mulvey et al., 2004). In addition, neighborhood disorder could potentially impact one's expectations for such success; thus, this known predictor of delinquency was included in the current study. The expectation to have work, family, and law abiding behavior variable is measured using the Perceptions of Chances for Success measure. Adapted from the work of Menard and Elliott (1996), this measure assesses the adolescent's predication of future adult success. The scale includes 6 items and using the Aspirations for Work, Family, and Law Abiding Behavior (e.g., "How important is it to you to have a good job or career?") and the Expectations for Work, Family, and Law Abiding Behavior (e.g., "What do you think your chances are to earn a good living?"). A total of 14 questions were asked, half regarding aspirations and half regarding expectations. Responses were on a 5-point Likert scale ranging from "Poor" = 1, "Fair" = 2, "Good" = 3, "Very Good" = 4, and "Excellent" = 5. The mean of all items are computed and higher scores indicate higher aspirations and expectations.

Another indicator of social disorder may be the perceived availability of guns in a neighborhood. In this study, gun accessibility was controlled for and participants of the study were asked the following question: "If a young person in this neighborhood wants to buy a gun, he/she can." Gun access is measured as a dichotomous variable. For this study, no gun access during the recall period is coded as 0 and gun access during the recall period is coded as 1.

Lastly, self-control serves as another control variable as it has been established as a predictor of substance use (Zimmerman & Kushner, 2017). It is measured using the Weiberger Adjustment Inventory (WAI) developed by Weinberger and Schwartz (1990). The measure asks participants to rank their behavior in the past 6 months. The statements cover four areas, impulse control (e.g., "I say the first thing that comes into my mind without thinking about it"), suppression of aggression (e.g., "People who get me angry better watch out"), consideration of

others (e.g., "Doing things to help other people is more important to me than almost anything else"), and temperance (combines items from impulse control and suppression of aggression). Responses to the previous statements ranged from "False" = 1, "Somewhat False" = 2, "Not Sure" = 3, "Somewhat True" = 4, and "True" = 5. Similarly, the items are averaged and higher scores indicate more positive behavior.

Research Design

In order to examine how exposure to violence and neighborhood conditions impact substance use, an examination of direct effects using multiple regression will be provided using SPSS statistical software. Although past research has examined potential moderating effects on similar concepts (Fagan et al., 2014; Fagan et al., 2015), the current study examines potential *mediating* effects where violence exposure may partially be a result of neighborhood social disorder, which in turn impacts substance use among youth. Using Baron and Kenny's (1986) four step process, mediation will be assessed. In addition, Sobel tests will be used to identify if the mediated effect is statistically significant.

Chapter 4: Results

Descriptive Statistics

The study sample includes 1,354 adolescents. Table 1 summarizes the descriptive statistics for the current study and the total sample. The descriptives include frequencies, range of values, means, and standard deviations for all of the study variables. Of the 1,354 participants, 86.4% were male and 13.6% were female. Age ranged between 14 and 19 years ($\bar{x}$ = 16.04, SD = 1.306). The majority of participants were African-American (n = 561, 41.4%) and the remaining respondents were Hispanic (n = 454, 33.5%), Caucasian (n = 274, 20.2%), and other races (n = 65, 4.8%).

More than half (53.2%) of the adolescents reported engaging in alcohol use in the past 6 months, 57.1% reported marijuana use in the past 6 months, and 12.6% reported engaging in cocaine use within the past 6 months. The mean for alcohol use was 2.89. When interpreting this finding, this means that on average most participants reported using alcohol less than 1 time per month. Next, the mean for marijuana use was 4.19, indicating that on average most participants reported using marijuana once per month. Lastly, the average for cocaine use was 1.44. This means that, on average, participants reported never using cocaine in their lifetime/not using cocaine at all. Additionally, the sample reported moderate levels of neighborhood social disorder ($\bar{x}$ = 2.31, SD = .81) and peer delinquency ($\bar{x}$ = 1.77, SD = .855). Moreover, the majority of participants reported perceived gun accessibility in their neighborhood (n = 733, 54.1%). However, a small percentage of respondents reported gang membership (n = 87, 6.4%). In addition, expectations of success ($\bar{x}$ = 3.42, SD = .815) and self-control ($\bar{x}$ = 2.96, SD = .950) are included in Table 1, as well as parental warmth – mother ($\bar{x}$ = 3.21, SD = .696) and father ($\bar{x}$ = 2.74, SD = .887).

Table 1. Descriptive Statistics of Study Variables (N = 1354).

Dependent Variable	$\bar{x}$	SD	Range	n	% yes
Alcohol use	2.8933	2.44200	1– 9	716*	53.1%*
Marijuana use	4.1868	3.41633	1 – 9	768*	56.9%*
Cocaine use	1.4415	1.44401	1 – 9	167*	12.4%*
Independent Variables					
Exposure to Violence – Victim	1.5751	1.45707	0 – 6	-	-
Exposure to Violence - Witness	3.7683	1.95590	0 – 7	-	-
Neighborhood Social Disorder	2.3120	.80583	1 – 4	-	-
Control Variables					
Age	16.04	1.306	14 - 19		
Biological Sex					
Male	-	-	-	1170	86.4%
Female	-	-	-	184	13.6%
Race					
Caucasian	-	-	-	274	20.2%
African-American	-	-	-	561	41.4%
Hispanic	-	-	-	454	33.5%
Other	-	-	-	65	4.8%
Parental Warmth - Mother	3.2083	.69561	1 – 4	-	-
Parental Warmth - Father	2.7413	.88719	1 – 4	-	-
Peer Delinquency	1.7650	.85455	1 – 5	-	-
Gang Membership	-	-	-	87	7.8%
Gun Accessibility	-	-	-	733	54.7%
Expectations of Success	3.4230	.81521	1 – 5	-	-
Self-Control	2.9624	.95023	1 - 5	-	-

***number and percent of respondents who reported any substance use during past 6 months**

Hypothesis 1 & 2: Examining Direct Effects of Independent Variables on Substance Use

Multiple regression analyses were conducted to examine the relationship between the independent variables and dependent variables. Tests for multicollinearity were run on neighborhood social disorder and exposure to violence (victim and witness) to determine whether it could lead to biased multiple regression analyses results. These variables should remain independent in order to accurately interpret the relationship between an independent variable and a dependent variable. Tests for multicollinearity revealed the following – exposure to violence as a victim and witness on alcohol (VIF = 1.389), marijuana (VIF = 1.387), and cocaine use in the past 6 months (VIF = 1.387). Testing for multicollinearity with variance inflation factors (VIF) revealed that neither exposure to violence as a victim or exposure to

violence as a witness were too highly correlated. Therefore, I proceeded with the multiple regression analyses.

The first hypothesis of the current study is that exposure to violence (both as a witness and victim) increases the likelihood of substance use (i.e., alcohol, marijuana, cocaine use). Accordingly, multiple regression analyses were conducted to examine these relationships separately for each substance (see Tables 2 – 4). Results of the regression analyses revealed that exposure to violence as a victim increases the frequency of alcohol and marijuana use, but not cocaine use. Additionally, results of the regression indicate that exposure to violence as a witness increases the frequency of alcohol use and marijuana use.

Table 2 summarizes the direct effects of the exposure to violence (victim and witness) on alcohol use. The multiple regression model with all predictors produced $R^2 = .240$, $F(14, 634) = 14.289$, $p < .001$. The model accounts for 24% of the variance in the dependent variable. As shown in Table 2, exposure to violence, both as a victim and witness, are positively and significantly correlated with the criterion, indicating that individuals who have been exposed to violence are more likely to engage in alcohol use at a higher frequency. Further, African-Americans report engaging in alcohol use at a lower frequency when compared to their Caucasian counterparts. Maternal warmth is positively and significantly correlated with the criterion, indicating that individuals who experience greater warmth from their mothers are more likely to engage in more frequent alcohol use. Additionally, peer delinquency is positively and significantly correlated with alcohol use, indicating that respondents who have delinquent peers are likely to engage in alcohol use at a higher frequency. Lastly, expectations of success is negatively and significantly correlated, indicating that higher expectations of success lower frequency of alcohol use. The following control variables were not significantly related to an

increase in alcohol use: age, biological sex, Hispanic, other race, parental warmth – father, gang membership, gun accessibility, and self-control.

Table 3 displays the analysis results of the effects of exposure to violence as a victim and witness on marijuana use. The multiple regression model with all predictors produced $R^2 = .183$, $F(14, 634) = 10.177$, $p < .001$. The model accounts for 18.3% of the variance in the dependent variable. As shown in Table 3, exposure to violence, both as a victim and witness, are positively and significantly correlated. This indicates that respondents who have been exposed to violence are likely to engage in marijuana use at a higher frequency. African-Americans and Hispanics report engaging in marijuana use at a lower frequency than their Caucasian counterparts. Further, paternal warmth is negatively correlated and significant, indicating that respondents experiencing greater paternal warmth were less likely to engage in frequent marijuana use. Peer delinquency is positively correlated and significant, suggesting that participants with delinquent peers are more likely to engage in less frequent marijuana use. Expectations of success is negatively and significantly correlated. This indicates that higher expectations of success decrease frequency of marijuana use. Lastly, self-control is negatively correlated and significant. This suggests that individuals who have more self-control are less likely to engage in frequent marijuana use. The following control variables were not significantly related to marijuana use: age, biological sex, other race, parental warmth – mother, gang membership, and gun accessibility.

Table 4 summarizes the direct effects of exposure to violence as a victim and witness on cocaine use. The multiple regression model with all predictors produced $R^2 = .138$, $F(14, 634) = 7.265$, $p < .001$. The model accounts for 13.8% of the variance in the dependent variable. As shown in Table 4, biological sex is negatively correlated and significant, suggesting that males in the sample are less likely to engage in frequent cocaine use compared to females. African-

American were also less likely to engage in frequent cocaine use compared to Caucasians. Peer delinquency is positively correlated and significant, suggesting that respondents who have delinquent report engaging in frequent cocaine use. Lastly, expectations of success is negatively correlated and significant. This indicates that participants who have higher expectations of success used cocaine less frequently than those with lower expectations of success. The following variables were not significantly related to cocaine use: exposure to violence as a victim and witness, age, Hispanic, other race, parental warmth – mother, parental warmth – father, gang membership, gun accessibility, and self-control.

Table 2. Direct Effects of Exposure to Violence on Alcohol Use.

Independent Variables	*B*	SE	β	t	Sig.
Exposure to Violence – Victim	.198	.075	.115	2.643	.008
Exposure to Violence – Witness	.129	.055	.107	2.351	.019
Control Variables					
Age	.069	.074	.034	.940	.347
Biological Sex					
Male	-.222	.248	-.032	-.895	.371
Race					
African-American	-1.072	.229	-.221	-4.680	.000
Hispanic	.046	.224	.009	.203	.839
Other	-.386	.394	-.036	-.981	.327
Parental Warmth – Mother	.275	.134	.082	2.053	.040
Parental Warmth - Father	-.125	.105	-.048	-1.197	.232
Peer Delinquency	.635	.117	.218	5.409	.000
Gang Membership	-.220	.301	-.026	-.729	.466
Gun Accessibility	-.128	.068	-.072	-1.882	.060
Expectations of Success	-.299	.111	-.100	-2.685	.007
Self-Control	-.161	.101	-.062	-1.589	.113
$R^2 = .240$, $F(14, 634) = 14.289$, $p < .001$					

Table 3. Direct Effects of Exposure to Violence on Marijuana Use.

Independent Variables	*b*	SE	β	t	Sig.
Exposure to Violence – Victim	.352	.112	.142	3.148	.002
Exposure to Violence – Witness	.254	.084	.147	3.107	.002
Control Variables					
Age	.124	.110	.042	1.129	.259
Biological Sex					
Male	-.557	.370	-.056	-1.505	.133
Race					
African-American	-.783	.341	-.112	-2.297	.022
Hispanic	-.712	.334	-.096	-2.134	.033
Other	-.800	.586	-.053	-1.264	.173
Parental Warmth – Mother	.332	.199	.069	1.667	.096
Parental Warmth - Father	-.453	.156	-.120	-2.908	.004
Peer Delinquency	.454	.175	.109	2.597	.010
Gang Membership	-.342	.449	-.028	-.761	.447
Gun Accessibility	-.023	.101	-.009	-.230	.818
Expectations of Success	-.425	.166	-.099	-2.566	.011
Self-Control	-.349	.151	-.094	-2.316	.021
$R^2 = .183$, $F(14, 634) = 10.177$, $p < .001$					

Table 4. Direct Effects of Exposure to Violence on Cocaine Use.

Independent Variables	*b*	SE	β	t	Sig.
Exposure to Violence – Victim	.045	.045	.046	1.002	.317
Exposure to Violence – Witness	.056	.033	.083	1.699	.090
Control Variables					
Age	-.058	.044	-.050	-1.327	.185
Biological Sex					
Male	-.457	.148	-.118	-3.092	.002
Race					
African-American	-.640	.136	-.236	-4.695	.000
Hispanic	-.076	.133	-.026	-.566	.572
Other	.075	.234	.013	.319	.750
Parental Warmth - Mother	.122	.080	.065	1.531	.126
Parental Warmth - Father	.022	.062	.015	.357	.721
Peer Delinquency	.271	.070	.167	3.877	.000
Gang Membership	.051	.179	.011	.282	.778
Gun Accessibility	-.021	.041	-.021	-.506	.613
Expectations of Success	-.135	.066	-.081	-2.040	.042
Self-Control	-.086	.060	-.060	-1.426	.154
$R^2 = .138$, $F(14, 634) = 7.265$, $p < .001$					

The second hypothesis is that perceived neighborhood social disorder increases the frequency of substance use (i.e., alcohol, marijuana, cocaine use). Accordingly, multiple regression analyses were conducted to examine these relationships separately for each substance

(see Tables 5 – 7). Overall, results of the regression analyses revealed that neighborhood social disorder increases frequency of marijuana use, but not alcohol use. However, neighborhood social disorder decreases frequency of cocaine use.

Table 5 summarizes the direct effects of neighborhood social disorder on alcohol use. The multiple regression model with all predictors produced $R^2 = .213$, $F(13, 635) = 13.237$, $p < .001$. The model accounts for 21.3 % of the variance in the dependent variable. As shown in Table 5, African-Americans report engaging in less frequent alcohol use than their Caucasian counterparts. Peer delinquency is positively and significantly correlated with alcohol use. This indicates that respondents who have delinquent peers are more likely to engage in more frequent alcohol use. Additionally, gun accessibility, expectations of success, and self-control were all negatively and significantly correlated with alcohol use. Indicating that access to guns, higher expectations of success, and higher self-control decrease frequency of alcohol use. The following control variables were not significantly related to alcohol use: neighborhood social disorder, age, biological sex, Hispanic, other race, parental warmth – father and mother, and gang membership.

Table 6 displays the analysis results of the effects of neighborhood social disorder and marijuana use. The multiple regression model with all predictors produced $R^2 = .150$, $F(13, 635) = 8.645$, $p < .001$. The model accounts for 15% of the variance in the dependent variable. As shown in Table 6, neighborhood social disorder is positively and significantly correlated with marijuana use, indicating that respondents who reside in socially disorganized neighborhoods are more likely to engage in marijuana use at a higher frequency. Further, African-American and Hispanic respondents report engaging in less frequent marijuana use when compared to their Caucasian counterparts. Paternal warmth revealed to be negatively and significantly correlated with marijuana use, indicating paternal warmth decreases frequency of marijuana use.

Additionally, peer delinquency was positively and significantly correlated with marijuana use. This suggests that participants who have delinquent peers are likely to engage in more frequent marijuana use. Lastly, expectations of success and self-control were both negatively and significantly correlated with marijuana use. This suggests that higher expectations of success and higher self-control decrease frequency of marijuana use. The following control variables were not significantly related to marijuana use: age, biological sex, other race, parental warmth – mother, gang membership, and gun accessibility.

Table 7 summarizes the direct effects of neighborhood social disorder and cocaine use. The multiple regression model with all predictors produced $R^2 = 13.5$, $F(13, 635) = 7.642$, $p < .001$. The model accounts for 13.5% of the variance in the dependent variable. As displayed in Table 7, neighborhood social disorder was negatively and significantly correlated with cocaine use. This indicates that neighborhoods that are socially disorganized decrease the frequency of cocaine use. Further, males engage in less frequent cocaine use than females. Also, African-American respondents report engaging in cocaine use at a lower frequency when compared to Caucasians. Peer delinquency revealed to be positively and significantly correlated with cocaine use, suggesting that participants who have delinquent peers are more likely to engage in cocaine use at a higher frequency. Lastly, expectations of success and self-control were both negatively and positively correlated with cocaine use. This indicates that higher expectations of success and higher self-control decrease frequency of cocaine use. The following control variables were not significantly related to cocaine use: age, Hispanic, other race, parental warmth – mother and father, gang membership, and gun accessibility.

Table 5. Direct Effects of Neighborhood Social Disorder on Alcohol Use.

Independent Variables	*b*	SE	β	t	Sig.
Neighborhood Social Disorder	.042	.125	.015	.340	.734
Control Variables					
Age	.106	.075	.051	1.418	.157
Biological Sex					
Male	-.107	.251	-.015	-.424	.672
Race					
African-American	-.924	.234	-.191	-3.942	.000
Hispanic	.116	.228	.022	.508	.612
Other	-.308	.400	-.029	-.771	.441
Parental Warmth – Mother	.265	.136	.079	1.954	.051
Parental Warmth - Father	-.120	.106	-.046	-1.131	.258
Peer Delinquency	.783	.117	.269	6.715	.000
Gang Membership	-.079	.306	-.009	-.257	.797
Gun Accessibility	-.189	.071	-.107	-2.650	.008
Expectations of Success	-.311	.113	-.104	-2.749	.006
Self-Control	-.236	.102	-.091	-2.308	.021

$R^2 = .213$, $F(13, 635) = 13.237$, $p < .001$

Table 6. Direct Effects of Neighborhood Social Disorder on Marijuana Use.

Independent Variables	*b*	SE	β	t	Sig.
Neighborhood Social Disorder	.557	.186	.133	2.988	.003
Control Variables					
Age	.205	.111	.069	2.988	.003
Biological Sex					
Male	0.325	.375	-.033	-.867	.387
Race					
African-American	-.788	.350	-.113	-2.251	.025
Hispanic	-.686	.340	-.092	-2.016	.044
Other	-.727	.597	-.048	-1.217	.224
Parental Warmth – Mother	.316	.202	.066	1.564	.118
Parental Warmth - Father	-.463	.158	-.123	-2.926	.004
Peer Delinquency	.645	.174	.154	3.702	.000
Gang Membership	-.189	.456	-.016	-.415	.678
Gun Accessibility	-.047	.107	-.018	-.439	.661
Expectations of Success	-.434	.169	-.102	-2.576	.010
Self-Control	-.447	.152	-.121	-2.935	.003

$R^2 = .150$, $F(13, 635) = 8.645$, $p < .001$

Table 7. Direct Effects of Neighborhood Social Disorder on Cocaine Use.

Independent Variables	*b*	SE	β	t	Sig.
Neighborhood Social Disorder	-.155	.073	-.095	-2.121	.034
Control Variables					
Age	-.052	.044	-.045	-1.188	.235
Biological Sex					
Male	-.429	.147	-.110	-2.914	.004
Race					
African-American	-.470	.137	-.173	-3.418	.001
Hispanic	-.007	.134	-.002	-.053	.957
Other	.129	.234	.022	.550	.583
Parental Warmth - Mother	.122	.079	.065	1.534	.126
Parental Warmth - Father	.034	.062	.023	.554	.580
Peer Delinquency	.350	.068	.215	5.123	.000
Gang Membership	.130	.179	.027	.724	.469
Gun Accessibility	-.075	.042	-.075	-1.790	.074
Expectations of Success	-.141	.066	-.085	-2.136	.033
Self-Control	-.124	.060	-.086	-2.074	.038

$R^2 = 13.5, F(13, 635) = 7.642, p < .001$

Hypothesis 3: Testing for Mediation

Regression analysis was used to investigate the hypothesis that exposure to violence mediates the relationship between neighborhood social disorder and marijuana use, as neighborhood social disorder was only significantly correlated with marijuana use in the expected direction. Mediation is tested using Baron and Kenny's (1986) four steps for establishing mediation. The first step in testing for mediation is to establish a relationship between neighborhood social disorder and marijuana use. These results are displayed in Table 6, which show that neighborhood social disorder is positively correlated and significant with marijuana use, indicating that neighborhood social disorder increases frequency of marijuana use.

The second step establishes a relationship between neighborhood social disorder and the mediators – exposure to violence as a witness and exposure to violence as a victim. Multiple mediators were tested simultaneously to determine if each effect is independent of the other

mediator (Baron & Kenny, 1996). The second step in testing for mediation treats exposure to violence as an outcome variable (Baron & Kenny, 1996). These results are displayed in Table 8 & 9. As shown in Table 8, neighborhood social disorder is positively correlated and significant with exposure to violence as a victim, indicating that neighborhood social disorder increases frequency of exposure to violence as a victim. The multiple regression model with all predictors produced $R^2 = .224$, $F(13, 635) = 14.101$, $p < .001$. The model accounts for 22.4% of the variance in the dependent variable. Similarly, Table 9 displays that neighborhood social disorder is positively correlated and significant with exposure to violence as a witness, suggesting that socially disorganized neighborhoods are likely to increase frequency of exposure to violence as a witness. The multiple regression model with all predictors produced $R^2 = .326$, $F(13, 635) = 23.588$, $p < .001$. The model accounts for 32.6% of the variance in the dependent variable.

The third step determines whether exposure to violence impacts marijuana use, while controlling for the causal variable (neighborhood social disorder). These results are displayed in Table 10. The multiple regression model with all predictors produced $R^2 = .188$, $F(15, 633) = 9.775$, $p < .001$. The model accounts for 18.8% of the variance in the dependent variable. As shown in Table 10, exposure to violence as a victim is positively correlated and significant with marijuana use, indicating that individuals who have been exposed to violence as victims are more likely to engage in marijuana use at a higher frequency. Likewise, exposure to violence as a witness is positively correlated and significant with marijuana use, suggesting that individuals who have been exposed to violence as witnesses are more likely to engage in marijuana use at a higher frequency.

The last step necessary to test for mediation is to establish the impact of neighborhood social disorder on marijuana use, while controlling for violence exposure. These results are also

displayed in Table 10. Neighborhood social disorder positively and significantly correlated with marijuana use, indicating that neighborhoods that are socially disorganized increase frequency of marijuana use.

Finally, the Sobel test determines if the indirect effects of the independent variable on the dependent variable are significant. The formula for the Sobel test drawn from MacKinnon and Dwyer (1993) and MacKinnon, Warsi, and Dwyer (1995) is as follows:

z-value = $a*b/\text{SQRT}(b^2*s_a^2 + a^2*s_b^2)$.

According to the Sobel results, the relationship between neighborhood social disorder, exposure to violence as a victim, and marijuana use is significant (p = .034). Additionally, the relationship between neighborhood social disorder, exposure to violence as a witness, and marijuana use is significant (p = .014). See Figure 1 below for a summary of the pathways.

Table 8. Testing the Relationship between Neighborhood Social Disorder and Exposure to Violence as a Victim (Step 2).

Independent Variables	*b*	SE	β	t	Sig.
Neighborhood Social Disorder	.209	.072	.124	2.909	.004
Control Variables					
Age	.116	.043	.097	2.699	.007
Biological Sex					
Male	.380	.145	.094	2.627	.009
Race					
African-American	-.107	.135	-.038	-.794	.427
Hispanic	-.001	.131	.000	-.011	.991
Other	.118	.230	.019	.515	.607
Parental Warmth - Mother	-.101	.078	-.052	-1.295	.196
Parental Warmth - Father	-.054	.061	-.035	-.882	.378
Peer Delinquency	.358	.067	.213	5.336	.000
Gang Membership	.456	.176	.093	2.594	.010
Gun Accessibility	-.091	.041	-.089	-2.217	.027
Expectations of Success	-.067	.065	-.039	-1.026	.305
Self-Control	-.198	.059	-.133	-3.375	.001

$R^2 = .224$, $F(13, 635) = 14.101$, $p < .001$

Table 9. Testing the Relationship between Neighborhood Social Disorder and Exposure to Violence as Witness (Step 2).

Independent Variables	*b*	SE	β	t	Sig.
Neighborhood Social Disorder	.580	.096	.239	6.048	.000
Control Variables					
Age	.121	.057	.070	2.105	.036
Biological Sex					
Male	.335	.193	.058	1.733	.084
Race					
African-American	.951	.180	.236	5.271	.000
Hispanic	.411	.175	.095	2.346	.019
Other	.328	.308	.037	1.068	.286
Parental Warmth - Mother	.080	.104	.029	.763	.446
Parental Warmth - Father	.095	.082	.044	1.165	.244
Peer Delinquency	.495	.090	.205	5.513	.000
Gang Membership	.263	.235	.037	1.117	.264
Gun Accessibility	-.221	.055	-.150	-4.021	.000
Expectations of Success	.024	.087	.010	.277	.782
Self-Control	-.225	.079	-.105	-2.862	.004

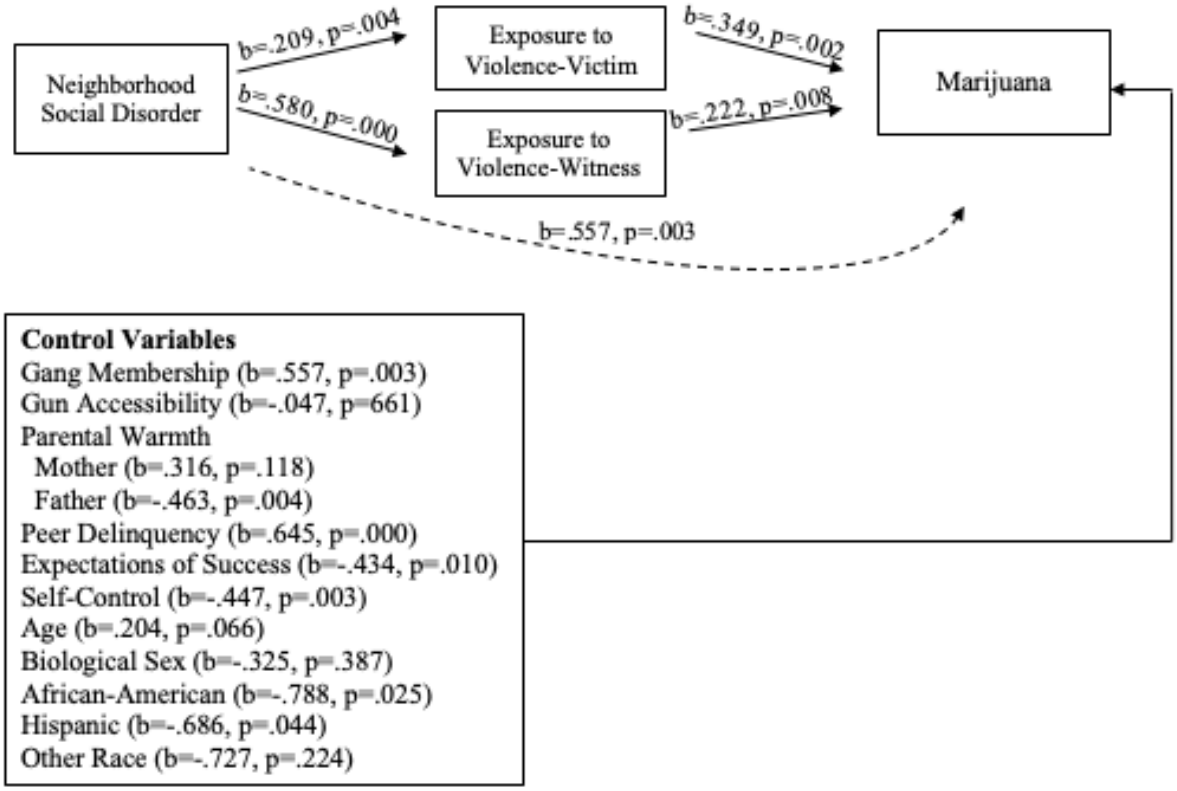
$R^2 = .326$, $F(13, 635) = 23.588$, $p < .001$

Table 10. Testing the Relationship between Neighborhood Social Disorder, Exposure to Violence (Victim and Witness), and Marijuana Use (Step 3).

Independent Variables	*b*	SE	β	t	Sig.
Exposure to Violence – Victim	.349	.112	.141	3.128	.002
Exposure to Violence – Witness	.222	.083	.128	2.659	.008
Neighborhood Social Disorder	.355	.188	.085	1.892	.059
Control Variables					
Age	.138	.110	.046	1.255	.210
Biological Sex					
Male	-.532	.369	-.053	-1.440	.150
Race					
African-American	-.962	.353	-.138	-2.723	.007
Hispanic	-.777	.335	-.104	-2.320	.021
Other	-.841	.585	-.055	-1.437	.151
Parental Warmth – Mother	.334	.199	.070	1.681	.093
Parental Warmth - Father	-.466	.155	-.123	-2.995	.003
Peer Delinquency	.410	.176	.098	2.329	.020
Gang Membership	-.407	.449	-.033	-.906	.365
Gun Accessibility	.034	.106	.013	.322	.747
Expectations of Success	-.416	.165	-.097	-2.518	.012
Self-Control	-.328	.151	-.089	-2.176	.030

$R^2 = .188$, $F(15, 633) = 9.775$, $p < .001$

Figure 1. Results of the Path Analysis Using Exposure to Violence as a Mediator.



Chapter 5: Discussion

Prior research on exposure to violence and substance use has been well-documented, however, the factors that mediate this relationship is still underdeveloped (Browning & Erickson, 2009; Fagan et al., 2015; Fagan et al., 2015; Pinchevsky et al., 2013; Sullivan et al., 2004; Wright et al., 2013; Zinzow et al., 2009). As discussed in Chapter 1, adolescents are more likely to be exposed to violence than adults. Further, approximately 20-30% of adolescents have been victims of violence which makes them more likely to engage in substance use. Identifying the factors that impact substance use, such as exposure to violence and neighborhood social disorder, will influence policy implications.

The theoretical framework used to examine this relationship is the life-course perspective. Life course theories focus on the impact of experiences on human development. Through this framework, the relationship between age and crime was examined. This relationship places importance on the age-crime curve which identifies the patterns of offending among individuals. Longitudinal research has been deemed a key piece of life course theories because they allow researchers to follow subjects for an extended period of time.

Terri Moffitt's developmental taxonomy (1993) posits that adolescent offenders can be divided into two groups – adolescence-limited offenders and life-course persistent offenders. Adolescents placed in the adolescence-limited group generally engage in offending during their adolescent years. Conversely, adolescents placed in the life-course persistent group tend to engage in offending throughout their life course. As discussed in Chapter 2, there are many characteristics that lead adolescents to fall into either one of these groups.

Additionally, Sampson and Laub's (1993) proposed that social bonds and adult social institutions impact antisocial behavior among adolescents. Weakened social bonds and lack of

adult social institutions increase the likelihood of antisocial behavior among adolescents. Further, this theory explains how family, work, and social roles facilitate socialization which results in abstinence from substance use. Despite experiences in childhood, social bonds help determine engagement in antisocial behavior.

The life course perspective has been applied to substance use as a way to explain and understand the process. Substance use careers are often compared to criminal careers because substance use is considered a subcategory of criminal behavior. Key concepts of substance use careers include the onset, regular use, cessation and relapse, all which occur over the life course. Onset usually occurs during adolescence and evolves into regular use. Cessation, or desistance, is the least studied stage of substance use as it is the most difficult part to assess. Measuring desistance includes figuring out the correct amount of time needed for follow-ups. Lastly, relapse is an understudied stage of substance use. Release is difficult to assess because it can be a single event, process, part of treatment, or part of recovery. Additionally, relapse and initiation share similar risk factors.

Substance use is identified as one of the many consequences of exposure to violence. As discussed in Chapter 2, one in five adolescents are exposed to violence yearly and three in five are exposed to violence before adulthood. The relationship between exposure to violence and substance use has been well-researched among criminologists. Many researchers have yielded positive findings regarding the relationship (Kilpatrick et al., 2000; Mrug & Windle, 2009; Sullivan et al., 2004; Vermeiren et al., 2003; Wright et al., 2013; Zinzow et al., 2009). However, less focus has been placed on the impact of neighborhood context of exposure to violence and substance use. Nevertheless, neighborhood social disorder has been linked to exposure to violence and substance use (Fagan et al., 2014; Fagan et al., 2015; Kilpatrick et al., 2000; Mrug

& Windle, 2009; Pinchevsky et al., 2013; Vermeiren & colleagues, 2003; Sullivan et al., 2004; Wright et al., 2013; Zimmerman & Kushner, 2017; Zinzow et al., 2009).

The purpose of this study was to identify the relationship between exposure to violence and substance use among serious adolescent offenders in the Pathways to Desistance data set. Additionally, this study sought to identify whether neighborhood social disorder mediated this relationship. Multiple regression and mediation analyses were conducted. Results of the examination of the direct effects of exposure to violence and substance use revealed several important findings.

First, exposure to violence as a victim and witness were both found to increase the frequency of alcohol and marijuana use. Previously discussed studies have found similar results (Kilpatrick et al., 2000; Mrug and Windle, 2009; Sullivan et al., 2004; Wright et al., 2013). Second, increased neighborhood social disorder was found to decrease the frequency of cocaine use and was unrelated to alcohol use. Although this was an unexpected finding, Jang et al. (2001) proposed that neighborhood disorder may not impact drug use, including cocaine use, because individuals are protected by families and social institutions. Their findings confirmed their hypothesis – despite neighborhood disorder, religiosity and protective networks reduced the positive relationship between neighborhood disorder and illicit drug use (e.g., cocaine use). Thus, potential moderators may help further explain the relationship between neighborhood social disorder and cocaine use. It should also be noted that a small portion of the sample in the current study engaged in cocaine use; thus, a larger sample size is necessary for further examinations. Additionally, studies previously discussed reported finding a negative association between neighborhood disadvantage and substance use (Gordon et al., 2020; Hanson & Chen, 2007). Findings suggest that accessibility to substances is higher for those residing in higher

income neighborhoods. In the current study, socially disorganized neighborhoods only increased the likelihood of marijuana use among participants. Based on previous findings, hard drugs may be more accessible to those living in neighborhoods with higher socioeconomic status backgrounds, whereas, softer drugs may be more accessible to those living in low socioeconomic status neighborhoods as a result of the pricing of substances.

The third hypothesis posits that the effect of perceived neighborhood social disorder on substance use is mediated by exposure to violence. This would mean that neighborhood social disorder increased the likelihood of being exposed to violence, which then increases the likelihood of engagement is substance use. Based on the findings of the direct effects, only marijuana use was tested for mediation. Based on the mediation model ran, the relationship between neighborhood social disorder and marijuana use is partially mediated by exposure to violence. The mediation is identified as partial because the effect of neighborhood social disorder on substance use still exists, although smaller in magnitude. Therefore, there is evidence that neighborhood social disorder may cause exposure to violence, which in turn causes substance use among adolescents. This finding adds to the existing literature on neighborhood context, violence exposure, and substance use, and suggests violence exposure as a potential mediator for future studies to investigate further.

Also important to note is that many of the control variables included in the models were consistently significant. Peer delinquency, expectations of success, and self-control were found to be strong predictors of frequency of substance use. Including these control variables provided insight as to how variables impact the frequency of adolescent engagement in substance use. Peer delinquency consistently revealed to increase the frequency of substance use, while expectations of success and self-control decreased the frequency of engagement in substance use.

Future research should identify and address whether these control variables have the ability to mediate or moderate the relationship of neighborhood context, violence exposure, and substance use.

Based on these initial findings, emerging support exists that violence exposure may mediate the relationship between neighborhood social disorder and marijuana use. Thus, living in a neighborhood with higher social disorder impacts one's likelihood of being exposed to violence, which further impacts their likelihood of using marijuana. Future studies should further examine this relationship. However, there are a number of limitations in the current study. This study was not longitudinal; therefore, causation cannot be firmly established. Future studies should follow-up using longitudinal analyses. Additionally, data used in this study came from two site locations, which impacts generalizability. Future research should include additional sites for increased generalizability of their findings. Further, this study only included cocaine as a hard drug. Future research should aim to study the effects of these relationships on other hard drugs such as hallucinogens, stimulants, LSD, et cetera. Another limitation of this study is that it solely focuses on *serious* adolescent offenders. Therefore, these findings cannot be generalized to all adolescent offenders. Future research may need to examine these same relationships on a sample of less serious adolescent offenders. Additionally, this study solely focused on substance use. Substance use refers to the use of drugs to socialize and/or feel the effects, however, abuse refers to reoccurring use that results in failure to complete obligations and/or reoccurring use despite problems caused by the use (American Psychiatric Association, 1994). Future studies may find it beneficial to include substance abuse. Lastly, enrollment in Mulvey and colleagues' (2004) Pathways to Desistance study began in 2000. Although it is an older dataset, overall findings are likely to remain the same as a result of the measures. For example, neighborhood social disorder

will most likely be defined the same regardless of the year. However, future studies should use more recent datasets to examine these relationships.

Based on the findings of the current study, several policy implications can be made. First, neighborhoods can engage in collective efficacy in order to maintain social control. Neighborhoods that engage in collective efficacy have the ability to impact youth development in a positive way and influence levels of community violence – with shared trust and resident cohesion, residents can help control youth behavior (Fagan, Wright, & Pinchevesky, 2014). Further, communities with high levels of collective efficacy are those in which the residents know each other and are more likely to take action in order to reduce delinquency. Residents in neighborhoods with collective efficacy are more likely to monitor youth and their activities, as well as interfere whenever disorderly conduct occurs. Additionally, youth will feel an added layer of supervision and protection knowing that their parents and/or neighbors are looking out for them.

Second, adolescents would benefit from violence prevention programs. The multiple regression analyses run consistently found that delinquent peers increased the likelihood of alcohol, marijuana, and cocaine use. Targeting adolescent violence would help reduce exposure to violence. Cooper et al. (2000) found that youth violence prevention programs reduce delinquency and violent/aggressive behavior. Specifically, the Life Skills Training prevention program seeks to reduce violence among students. Through the program, students are taught skills which can be used when encountered with pressure to engage in violence. The Life Skills Training program has yielded significant findings and has been shown to reduce violence and delinquent behavior (Botvin et al., 2006). Further, school-based violence prevention programs seek to reduce aggressive behavior and violence among children. Studies examining the

effectiveness of these programs have yielded positive findings. In a study focusing on high-risk children, Mytton et al. (2002) found that school-based programs were effective in reducing aggressive and violent behavior.

Third, adolescents can be tested for identification and screening for exposure to violence. As discussed throughout, exposure to violence negatively impacts adolescents, therefore, screening and testing for exposure to violence and its consequences can be very beneficial for adolescents (Chamberlain, 2016). Adults, such as teachers, caregivers, and parents, should be trained to be more watchful for incidents in which adolescents may be exposed to violence (US Attorney General's National Task Force on Children Exposed to Violence, & United States of America, 2012). Early identification would require adults to focus on violence found in the community that would normally be overlooked as ordinary events or incidents that would make adolescents "tougher" (US Attorney General's National Task Force on Children Exposed to Violence, & United States of America, 2012). Identification of exposure to violence among adolescents would require teaching individuals to recognize forms of violence and events in which adolescents may be exposed. Adults should familiarize themselves with agencies that are charged with protecting children so that they know where to take adolescents when they are suspected to have been exposed. Further, tools have been developed for teachers and professionals so that they may assess adolescents for exposure. According to the US Attorney General's National Task Force on Children Exposed to Violence (2012) report, professionals should routinely identify adolescents exposed to violence. Some of these exposure to violence tests include the Exposure to Violence Screening Measure (EVSM), which is designed to be a brief screening interview for adolescent 10 years or older (Chamberlain, 2016). This tool has been assessed for validity, and overall support for the EVSM was found (Weist et al., 2002).

Fourth, programs have been identified as successfully reducing substance use among adolescents. Most notably, programs involving family members or group counseling have been found to be the most effective in reducing substance use (Tanner-Smith et al., 2013). Multidimensional Family Therapy (MDFT) aims to treat substance using adolescents and those at risk for behavioral problems. MDFT has been shown to be effective in treating severe substance use disorders (Liddle et al., 2009). Cognitive Behavioral Therapy (CBT) targets problem behaviors such as drug use. It teaches participants to develop effective coping strategies. CBT has been found to be effective in treating adolescents with substance use disorders (Kaminer & Waldron, 2006). Further, these forms of treatment are not only beneficial for the adolescent offender, but also for other children in the family.

The current study is an initial investigation for future studies to build from to assess the effect of neighborhood social disorder and violence exposure on substance use. The current study not only found support for direct effects of violence exposure and neighborhood social disorder on substance use, but also found evidence of mediation effects. Additionally, this research has important potential policy implications, including the needs for prevention, intervention, and rehabilitation efforts and screenings. Future research should address the limitations of the current study and expand on this area of research in order to understand the vast effects of neighborhood social disorder on exposure to violence and substance use.

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